



The Reverchon Naturalist

Recognizing the work of French botanist Julien Reverchon, who began collecting throughout the North-Central Texas area in 1876, and all the botanists/naturalists who have followed ...

The Story of a Tree—It's All in the Rings

*Story by Mary Webb-Marek
NRCS Zone Forester
Bryan, Texas*

The concept of determining tree age is well known—simply count the rings. Most young children understand this simple process, but in order to understand how rings are formed, one needs to understand the physiology of a tree. Tree rings provide a lot of useful information such as the tree's age and how well the tree is competing for sunlight, moisture and nutrients. Tree rings or growth provide useful information to guide the management of the forest and maintain healthy trees.

Only the very tips of a tree's roots, leaves, buds, flowers, seeds and a thin layer of cells beneath the bark known as the cambium are actually living. This cambium layer extends from the roots to the ends of branches, adding thickness to the tree. The cells that form on the outside of the cambium layer become bark, and the cells that form on the inside become the wood, giving the tree strength and structure. It's here where annual growth rings can be found.

Trees in temperate climates such as ours here in North America grow in diameter each year by adding a single layer of wood. Growth occurs most rapidly in the spring months, when the thin-walled cells of the xylem

or the water-conducting system of a tree expand. In a cut trunk or cross section, these cells are seen as the light-colored rings known as springwood or earlywood. In the late summer, growth usually slows and these cells become smaller and tend to have thicker walls. This summerwood or latewood is seen in the darker rings of the cross section. The combination of these two rings: springwood and summerwood are considered to represent one year of growth.

The easiest method for counting tree rings is usually by examining the complete cross section of a tree. This option is not always viable, since obtaining a cross section would involve cutting the tree. However, the age of standing trees can be determined by extracting a sample core of wood with an instrument known as an increment borer.



This photograph shows the increment borer getting ready to take a core sample. (Photo courtesy of Mary Webb-Marek, USDA-NRCS)

(Continued on page 6)



**By Ricky Linex
NRCS Wildlife Biologist
Weatherford, Texas**

Are You Seeing a Second Spring?

Travelling around much of North-Central Texas in the past month reveals an abundance of green growth of grasses and the blooming of flowers on many forbs. It seems like a second spring as the onset of fall began cooling off the days and rains returned to many counties. This month it is not unusual to see maturing grass heads growing adjacent to green grass heads adjacent to flowering forbs. If you look in the plant books for many of these forbs, including four o'clocks and catclaw sensitive brier which was seen blooming in early October, they are within the outer fringes of the normal range of their blooming periods while many are trying to produce a seed crop prior to that first frost. Perhaps these plants are trying to make up for a very dry 2011 and the dry summer of 2012. Frequently after we receive really good rains, such as in the past month, the thought of recent drought fades in our memories. Do you remember how dry it was in 2011? By spring of 2012, we thought the drought was over but a hot dry summer in 2012 taught us that we were not out of the woods just yet. It should be clear to all land managers by now that managing the plants used by livestock and wildlife is what keeps you in business and not the animals themselves. The old saying that ranchers are actually grass farmers rings true for wildlife managers as well.

If you think about the diets of white-tailed deer, they eat forbs, browse, mast and a little bit of grass. In much of Texas and especially in north-central Texas in 2011, there were no annual forbs seen and while the perennial forbs did initiate growth, the production on these perennials was down significantly. What carried the load for these white-tails in 2011, and in many previous droughts, was the browse component in their diet. The browse greened up and grew through the drought, and was utilized by the deer for a majority of their nutritional needs simply because it was available. Since there are differences in the quality of various browse utilized as forage for wildlife and livestock a person must be able to identify these woody species to know which to keep and what can be removed by chemical or mechanical means. To showcase the importance of understanding woody plants in a diverse landscape, how they grow and can be aged, this issue has two articles to introduce managing for woodies.

To complement the importance of woody plants in our landscape we offer a quiz on identification of cross-sections of trees and shrubs that are cut and polished to reveal the color and beauty in the wood. With these wooden nickels you judge each on the merits it reveals, not on prejudices learned elsewhere. The lowly mesquite and cedar can be just as showy as the statelier pecan and walnut. Steve Nelle gave me the first of these wooden nickels that he made after he received some from Roger Q. Landers, better known to his friends as Jake Landers. Jake retired several years ago as extension range specialist from the Texas AgriLife Extension Service in San Angelo. Since then he has cut and polished many a wooden nickel. Jake has excellent plant identification skills, and has shared his knowledge with many landowners and interested plant geeks. I'm proud to call him a friend and so Jake, this wooden nickel quiz is in your honor.

Engelmann's Daisy: Ice Cream Plant That's On the Menu for Grazing and Nutrition

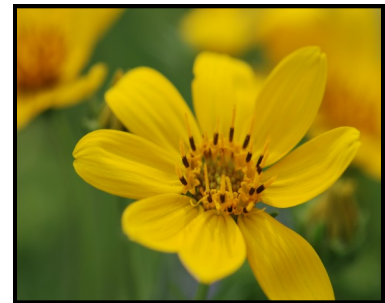
*Story by Melissa Sturdivant, NRCS Soil Conservationist
Goldthwaite, Texas*

Few can refuse the delectable smooth and refreshing taste of ice cream. Livestock and wildlife are no exception, but it is our native rangeland which offers a delectable smorgasbord of “ice cream” plants.

As a cool-season forb or wildflower, Engelmann's daisy (*Engelmannia peristenia*; synonym *Engelmannia pinnatifida*) is usually one of the first wildflowers to blanket the landscape with bright yellow color in early spring. This plant is highly palatable and digestible, and enticing with its lush green growth when most of the landscape is stark and brown. Engelmann's daisy is often considered an “ice cream plant” for both livestock and wildlife, for it is quickly grazed upon and tends to disappear from the landscape as rapidly as it emerges. As a result, a location where this plant thrives and tends to be noticed is usually limited to areas along roadsides and where grazing is restricted.

Engelmann's daisy benefits many wildlife species and livestock. Because of its high protein content of about 25 percent during spring growth, Engelmann's daisy provides highly-valued and palatable forage for livestock and wildlife before warm-season growth begins on the rangeland. This plant is also an excellent pollinator and nectar food source. As a prolific seed producer, Engelmann's daisy provides food for songbirds and upland game birds, in addition to small mammals, and its upright growth provides protective cover for small mammals.

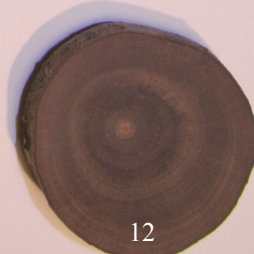
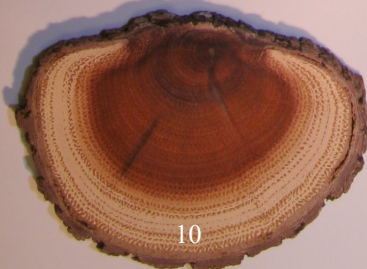
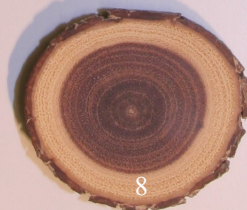
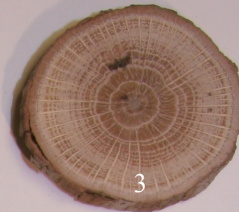
Engelmann's daisy is a cool-season perennial and a member of the sunflower family (*Asteraceae*). This native forb over-winters in rosette stage and bolts in early spring during March or April and growth continues into the fall. Its stout, upright growth branches above and produces terminal clusters of yellow flowers. A mature plant can reach up to 3 feet in height. The stem and leaves are covered with coarse hairs. The basal leaves are deeply lobed up to 8 inches, but decrease in length in the upper part of the plants stem. An interesting fact about Engelmann's daisy is that it is monotypic; it is the only plant species in the genus *Engelmannia*. Engelmann's daisy is well adapted to a variety of ecological sites. Its native range includes North and Central Texas, including the Edward's Plateau and has been found as far north as South Dakota, and as far west as Arizona. *(Continued on page 6)*



The photo, top left, reveals upright growth typical for a mature Engelmann's daisy with hairy stems and deeply lobed leaves, top center, along with the plant's flower head, top right, displaying eight rays and notched petals. *(Photos courtesy of Melissa Sturdivant, USDA-NRCS)*

Wooden Nickel Quiz

Identify these wooden nickels cut from trees and shrubs commonly found in the Edwards Plateau vegetational region. Thanks to Steve Nelle for supplying these nickels and to Roger Q. "Jake" Landers for initiating the idea of the nickels. The answers to this quiz can be found on page 8, and the trees and shrubs of the Rolling Plains region will featured in the November/December issue.



(Continued on page 8)

Maximilian Sunflower

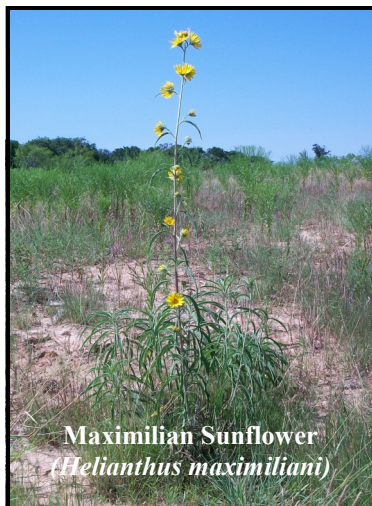
*Story by Rebecca Svoboda
NRCS Soil Conservationist
Granbury, Texas*

Over the last few years, I have had the opportunity to work in several offices throughout north-central Texas. Most producers are still in the cattle business and want to maintain their rangeland for that purpose. However, wildlife management is bringing in extra income and more producers are looking to maintain forage and habitat for wildlife as well as cattle. We always have our favorite grasses that do well in this area like little bluestem, indiangrass, and sideoats grama, however, forbs are an important part of every range site and shouldn't be left out.

Maximilian sunflower is a forb that is used a lot in the offices I have worked. Its scientific name is *Helianthus maximiliani* Schrad. This forb is almost always available for purchase and it is used by birds, deer, and livestock. It is a warm-season perennial species that is native to this region, specifically regions 2-5, and 7-9. It can reach up to 11-feet tall, and it reproduces from seeds as well as from crown or woody rootstock. This sunflower is a prolific seed producer which makes the seeds a favorite with the birds. Deer as well as livestock will eat the foliage especially when the plants are young. Because it is such a prolific seed producer it is used often in land reclamation, and is often included in range mixes when we are attempting to re-establish a healthy ecosystem.

Maximilian sunflower is a plant that prefers wet soils, prairies or areas that will stay somewhat moist throughout the season. This sunflower has a grayish-green color to its leaves, and they are long and folded upward. It will have several flowers on the upward portion of the stalk, and the flowers are a bright yellow and the petals are toothed. It will start blooming in mid to late summer and last thru early fall.

Forbs are an important part of the ecosystem and should be a part of every range mix. Most domestic animals will utilize them to a certain point and they are the main food source for wildlife. When range mixes are tailored to the ecosystem and a proper grazing plan is utilized it benefits everyone involved.



Maximilian sunflower can grow up to 11-feet tall, top left, and on a good year has flowers and seed produced through the fall, center, and is a warm-season perennial with grayish-green leaves, top right, while being a prolific seed producer. (Photos courtesy of Rebecca Svoboda, USDA-NRCS)

(Continued from page 1—The Story of a Tree)

This method does not require the tree to be cut, and can usually give a reliable count of rings. An increment borer is comprised of a small, hollow auger or bit, which is bored directly into the trunk of the tree until it reaches the estimated tree center or pith. With this, a core of wood is forced into the hollow auger, and then the auger is backed out with a reverse motion. The sample core includes the annual rings that can be counted to determine the age of the tree at the height where the sample was taken. Usually, an increment core is taken at breast height, which is 4.5 feet above ground.

Tree age, when compared with its height can reveal the quality of the site where it is growing. Also, when we examine a tree's annual growth rings, we better understand local climate conditions, forest health and disturbance occurrences such as wildfire or insect outbreaks. Tree rings are not always symmetrical, and disturbances can interrupt the regularity of growth rings, so ring width, scars and other features can easily depict events in a tree's life. Special scientists known as *dendrochronologists* study annual growth rings of trees, and use this information to date past variations in climate. These studies have become increasingly important as we strive to better understand our world in the context of time.



The core sample after being bored directly from the tree without the tree being cut usually renders a reliable count of rings. (Photo courtesy of Mary Webb-Marek, USDA-NRCS)

(Continued from page 3—Engelmann's Daisy)

Engelmann's daisy reproduces from seed and although seed can be collected in early June after the seed has matured, seed for this highly-valued plant is readily available from commercial seed companies. Trying to transplant Engelmann's daisy can be a tough chore because of its extensive woody tap root.

If you desire to transplant this forb, choose young rosettes and dig deeply to get as much of the tap root as possible. Management of stands is needed to ensure that the plant does not decrease as a result of overgrazing. Because it is highly palatable, Engelmann's daisy serves as a good indicator plant for overall rangeland health conditions. To increase this plant, shallow disking of the soil can redistribute seed in addition to range seeding.

Yes, "ice cream" can be on the menu, and many species of wildlife and livestock will benefit from the nutritive value offered from Engelmann's daisy. When you plan to range seed, make sure you include Engelmann's daisy in your seed mix to provide forage for wildlife and livestock.



It is common to find colonies of Engelmann's daisy once it has become established, as well as a multitude of seedlings that grow adjacent to a upright mature plant. (Photo courtesy of Melissa Sturdivant, USDA-NRCS)

Annual Broomweed: Mr. Bobwhite's Friend or Mr. Cowman's Late-Season Enemy

Story by Matt Beseda, NRCS District Conservationist
Bowie, Texas

Around July 4th every year, I begin to hear talk around ranchers about the “weed” crop they have on their native pastures for the year. These so called “weeds” are most likely warm-season forbs that are most recognizable during midsummer to fall periods when the plants are taller and beginning to flower. One of the most recognizable forbs is annual broomweed (*Amphiachyris dracunculoides*). This plant is a warm-season native plant that belongs to the sunflower family *Asteraceae*.

The reason the plant is so easy to spot is that in late summer to early fall the broomweed plant's canopy becomes so dense that no other plants have a chance to grow around this stand. The broomweed also flowers at this time, which also adds to its distinctive visual characteristic. Although the cattleman is frowning about this time of year if this happens in his native pastures, the Northern bobwhite quail is becoming quite happy to see this distinct canopy and anxiously awaiting an abundant fall meal.

Broomweed seeds begin germinating in December in most years. A wet winter is ideal for a young broomweed seed. Germination can last until April depending on the season and rainfall amounts into early spring. During this early spring growth, the rosette becomes flat on the ground and bolting of the main stem begins. During main stem elongation, dark green pinnate leaves are present on the main stem, and the “broom” begins to take shape. This is optimal time for chemical treatment since the majority of leaves are present at this time.

As this canopy forms throughout mid to late summer, the surrounding grass plants begin to disappear. This is due to robbing the soil of moisture and of sunlight since the canopy begins to form a thicket. But the bobwhite is getting excited at this point. He knows a good canopy of broomweed is an ideal place to hide from predators during the dog days of summer. During this growth period, the leaves begin to fall off the stem. Fine narrow leaves are present on branch stems and small yellow flowers begin to bloom, which take over the canopy appearance. This canopy is now 15 to 30 inches tall and the main stems of the plants become wood-like. (Continued on page 8)



Annual broomweed, above, in full bloom.
(Photo Credit: Ricky Linex, USDA-NRCS)

(Continued from page 7—Annual Broomweed)

Now the only way, the cow man can deal with the plant is by mechanical mowing. While the yellow flowers take the thicket over visually, the non-encapsulated seed begins to form and harden. This seed is what the bobwhite has been waiting for all season. Studies have shown that bobwhite's stomach may have up to 90 percent broomweed seed during late fall through winter periods. So at this part of the year, Mr. Bobwhite is the happiest. A stomach full of high protein seeds and good available cover remains with the senescence of broomweed from this growing season. But now the cowman still has to deal with this senescence (old growth plants) through the winter. The plants dead litter remains very resistant to break down, and cattle are trying to graze through the dead canopy to desirable forage may be impelled by dead branches that can lodge into the eyes and nose.

Mr. Bobwhite and the cattleman have been playing this game with broomweed for a long time out on the range. The broomweed will thrive on many soil types and is adapted to most of Texas and the South-west. Although the site of a broomweed thicket may upset a cow looking for a daylong meal; a Northern bobwhite quail thinks that thicket may be his last saving grace for survival.

(Continued from page 4— Wooden Nickel Quiz)

**Wooden Nickel Quiz Answers—how well
did you know your trees and shrubs in
the Edwards Plateau vegetational region?**



1. Texas ash
2. Bigtooth maple
3. White shin oak
4. Mountain mahogany
5. Flameleaf sumac
6. Little walnut
7. Mountain laurel
8. Roemer acacia
9. Ashe juniper
10. Green condalia
11. Kidneywood
12. Texas persimmon

*Stay tuned for more quizzes in
the Reverchon Naturalist to
sharpen your identification
skills throughout the many re-
gions of north-central Texas.
(Photo courtesy of Ricky Linex,
USDA-NRCS)*

How Does a Tree Work?

*Story by Jim Stanley
Texas Master Naturalist
Kerrville, Texas*

Have you ever stopped to think about what goes on inside a tree? We know that the roots of a tree take up water and minerals from the soil and transport them to the leaves where some of the water is used in photosynthesis to combine with carbon dioxide from the air to make sugars, starches and cellulose.

But the roots are 30 to 50 feet below the top of the average tree, and there are many trees that are several times that tall. How does the water get up to the leaves? Trees don't have hearts. They don't really even have a closed circulatory system. So how does it work?

Just under the bark of a tree are three structures that are involved with the transportation of fluids within the tree. The outermost structure is the phloem (pronounced flow-em), just inside that is the cambium and then the xylem. The xylem and the phloem structures are made up of many long cells connected end to end in a chain that reaches from the roots to the leaves that form rings of living tissue just under the bark.

The xylem, running from the finest root hairs to the tallest leaf is where water and minerals from the soil are transported to the leaf. But how does it get there? If we were designing such a system, we would use a pump, which would require an external energy source. The tree doesn't have a pump.

Moreover, it turns out that there is an unbroken column of water from the roots to the top leaf, from one xylem cell to another all the way to the top. The water molecules are attached to each other in this column of water by adhesive and cohesive molecular forces. On the underside of the leaves are microscopic structures called stomas, which open and close with temperature and humidity and where droplets of water evaporate.

When a water molecule evaporates from a leaf, in a process called evapotranspiration, its place is taken up by the next molecule below it, which pulls up the molecule below it and so on and so on all the way down to the roots. In turn, water flows from the roots to the leaves through the xylem cells.



Live Oak
(*Quercus fusiformis*)

When the leaves make sugars from carbon dioxide and water, not all of these sugars are used to make starches and cellulose for the leaves. The roots have to grow too, and they can't make their own sugars. So sugar solution made in the leaves (sap) is transported down to the roots through the phloem structures under the bark. The sugar molecules are the building blocks for starches and cellulose, the former being energy stores and the latter being structural components (wood) of the plant.

(Continued on page 10)

(Continued from page 9— How Does a Tree Work?)

How does a tree make its first leaves of spring when it doesn't have any leaves as yet to carry out photosynthesis? The answer is that sugars are transported from where they were stored in the roots for the winter back up the phloem to make the new leaves. So at different times, sugar solution can flow both directions in the phloem. How does it do that?

The energy to drive that process is called osmotic pressure, in which water in the xylem flows into cells with high sugar concentrations, forcing the sugar solution into the phloem which then flows through the phloem into cells with lower sugar solutions. Thus sugar is transported from areas of high concentration to areas of low concentration. In the summer and fall the leaves have higher concentrations of sugar than the roots, but in the early spring the roots have the higher concentration, and these concentration gradients drive the flow of sap from where it is not needed to where it is.

By the way, the process of storage of starches in the roots is where we get our potatoes, carrots, radishes, turnips and beets, and the sap flow in early spring gives us maple syrup.

Most of the growth of trees is at the tip of the branches as the tree grows taller with longer branches. But the trunks also grow a little in diameter each year as older xylem becomes sapwood and older phloem becomes bark, and are replaced by new layers of phloem and xylem produced in the cambium. This process is revealed in the growth rings of trees.

Jim Stanley is a Texas Master Naturalist and the author of the book Hill Country Landowner's Guide. He can be reached at jstmn@kctc.com and previous columns can be read at www.hillcountrynaturalist.com.

UPCOMING CALENDAR OF EVENTS

- October 20, **Bear Creek Ranch Grass Tour**, Aledo, TX. 9:00 am – noon. 2701 Bear Creek Road, RSVP to Eileen Porter re44porter@yahoo.com for map, lunch will be provided to those pre-registered. Dress for the field with easy to moderate hiking to see grasses, forbs & woody plants.
- October 25, **Deer Management Program**, Stephenville, 9:00 a.m. - 2:45 p.m. Contact Whit Weems, Texas A&M AgriLife Extension w-weems@tamu.edu RSVP by October 22.
- October 26, **Pasture Management/Conversion and Wildlife Program**, Eastland, 9:00 a.m. – 3:00 p.m. Registration fee, meal and 5 CEU's. Contact Makenzie Wyatt, 254-629-1093 Texas A&M AgriLife Extension mawyatt@ag.tamu.edu or ShaMarie Tamminga, 254-629-1636 Ext. 3, Natural Resources Conservation Service Shamarie.tamminga@tx.usda.gov RSVP by October 22.
- November 15, **Shackelford County Range and Wildlife Management Association and Natural Resources Management Workshop**, Albany, 9:30 a.m.-2:45 p.m., Registration fee—\$10.00 and includes meal and 3 CEU's. RSVP to Troy Reinke at 325-762-2552 Ext. 3 (Natural Resources Conservation Service), troy.reinke@tx.usda.gov or Rocky Vinson at 325-762-2232 Ext. 117 (Texas A&M AgriLife Extension), r-Vinson@tamu.edu.
- November 18-19, Ken Burn's **The Dust Bowl**, a documentary about a period in history causing major damage to prairie lands, airs on PBS at 7-9 p.m. (CST).

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